

Work Order ID 67557

Monday, March 28, 2011 10:37:51 AM



Page 1

Item ID: D412-664-203

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 3/28/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 4/15/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Stop



Approvals: Process Plan: Date: 11-03-28 Tooling: Date:
QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
----------	--------------

D412-664-243	E
--------------	---

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

416007 8110724

AG Car BG 11-5-24

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

DP

11-5-9

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

DP

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00

QC

Memo

0.00

Quality Control

140

Crosstubes

0.00

Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 and drill table DT8577 using #9 holes as per QSI 10 to install towers.

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-SCRIBE PART # & BATCH #

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

SAD

11-05-12

①

11-5-11

11-5-11

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150  HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion Memo	0.00 0.00		SAO 11-05-12		①			
160  QC Quality Control	QC3- Inspect Part Finish Memo	0.00 0.00		Jul 15/13					
170  QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00		Jul 15/13					

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Customer:

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  Outsource2	Outsource process - NDT per QSI038 4.1	0.00							
	Memo	0.00							
	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 14089 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190  Packaging	Packaging	0.00							
	Memo	0.00							
	Inspect for transit damage Ensure copy of NDT results attached to work order.								
200  QC	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							
	Inspect for damage & ensure results are as per Dwg D412-664-203								

CY 11/05/13 ①

11/05/13 ④

RT 11-05-13

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
	SprayPaint	0.00							
Spray Painting	<div><div><div><div>1-Prime inside and outside crosstube as per QSI 005 4.2</div><div>2-Paint outside crosstube with White Imron as per QSI 005 4.2</div><div>PRIME:</div><div>Start Time: _____</div><div>Fininsh Time: _____</div><div>PAINT:</div><div>Start Time: _____</div><div>Finish Time: _____</div></div><div><div>11-05-16</div><div>11-05-17</div><div>664243-E-1</div></div></div><div><div><div>QC14- Inspect Spray Paint</div><div>QC</div><div>Quality Control</div></div><div><div><div>Memo</div><div>Then, Wrap in plastic bag to protect from scratches</div></div></div></div></div>								
220	QC14- Inspect Spray Paint	0.00							
	QC	0.00							
Quality Control	<div><div><div>Memo</div><div>Then, Wrap in plastic bag to protect from scratches</div></div></div>								

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

230



Crosstubes

Crosstubes

Memo

Crosstubes

Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015. Adhere for 12 Hrs

A/R 6398 Magnobond Batch: 116677
Expiry Date: 11-08

3-Install clamps as per Dwg D212-664-203 using installation jig DT9024 with 0.010 thick brass shims on both chafing shield (D3189-1). Torque clamps to 80-100 in lb.

install chafing shield using pro seal as per Dwg 412 664 243-E-1

240



QC

Quality Control

QC5- Inspect part completeness to step on W/O

Memo

0.00

0.00

*5/11/05/24**(X)*

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
		Eric Put a label						

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

11/5/24

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8/11/24

70

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

REV I

11/5/24

Identify and pack for shipping as per PPP D412-664-203

*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27

for application time & date *****

Time & date of packaging: _____

Location: _____

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Item Name: Crosstube Aft

Start Date: 3/28/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 4/15/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

11/5/25

ME
11-05-24

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

Monday, March 28, 2011 10:37:59 AM

Page 1

Work Order ID: 67557

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft



Start Date: 3/28/2011

Required Date: 4/15/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E 04.02.16 Reformat; Added D3189-1 K/DS
 IPP Rev:F 06-03-29 Remove Comments on Pick List JLM
 IPP Rev:G 06.12.08 per ECN 886 EC
 IPP Rev:H 07-04-30 As per Rev D JLM
 IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D412-664-203TRN 		Manufactured	No			110	Each	0.0000	1	1			
Crosstube Turning Detail													
D2856-600 		Manufactured	No			230	f	111.4800	1.76	1.76			
Abrasion Strip													

1369252

1-1 DP 11-5-9

NA per DD

Location	Loc Qty	Loc Code
ST409	111.48	
25656	14	
26650	31	
37668	66.48	

D2896-1 	Manufactured	No				230	Each	6.0000	1	1			
Support													

67742

11-05-20

Location	Loc Qty	Loc Code
LG052	6	
58356	6	

D3189-1 	Manufactured	No				230	Each	20.0000	2	2			
Chafing Shield													

11-05-20

Location	Loc Qty	Loc Code
FG	4	
36065	4	
LG053	16	
63982	16	

X2

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Monday, March 28, 2011 10:37:59 AM

Page 2

Work Order ID: 67557

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 3/28/2011

Required Date: 4/15/2011

Start Qty: 1.00

Required Qty: 1.00

D3595-063-570

Manufactured No

230 Each

51.0000

2

2



RUBBER CUSHION



PT 11-05-20

Location

Loc Qty

Loc Code

FG

13

37971

1

42243

12

LG055

38

42243

17

63406

21

x2

MS21920-28

Purchased No

230 Each

57.0000

4

4



Clamp(per MIL-DTL-8783C)



PT 11-05-20

117344

Location

Loc Qty

Loc Code

FG

5

105884

5

LG050

52

116039

2

116839

50

MS21920-30

Purchased No

230 Each

86.0000

2

2



clamp(per MIL-DTL-8783C)



PT 11-05-20

Location

Loc Qty

Loc Code

LG050

36

109181

36

LG051

50

111258

50

x2

Monday, March 28, 2011 10:37:59 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 3/28/2011

Required Date: 4/15/2011

Start Qty: 1.00

Required Qty: 1.00

AN6-40A

Purchased

No

250

Each

58.0000

4

4



Bolt



M117366

Location

Loc Qty

Loc Code

ST343

58

115300

18

115905

20

116549

20

AN6-41A

Purchased

No

250

Each

29.0000

2

2



Bolt



M117688

Location

Loc Qty

Loc Code

ST344

29

115316

29

AN960JD616

NAS1149D0663J

Purchased

No

250

Each

0.0000

18

18



Washer



M117291

MS21042L6

Purchased

No

250

Each

166.0000

6

6



Nut



M117343 115648

Location

Loc Qty

Loc Code

ST300

166

116373

66

116548

100

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

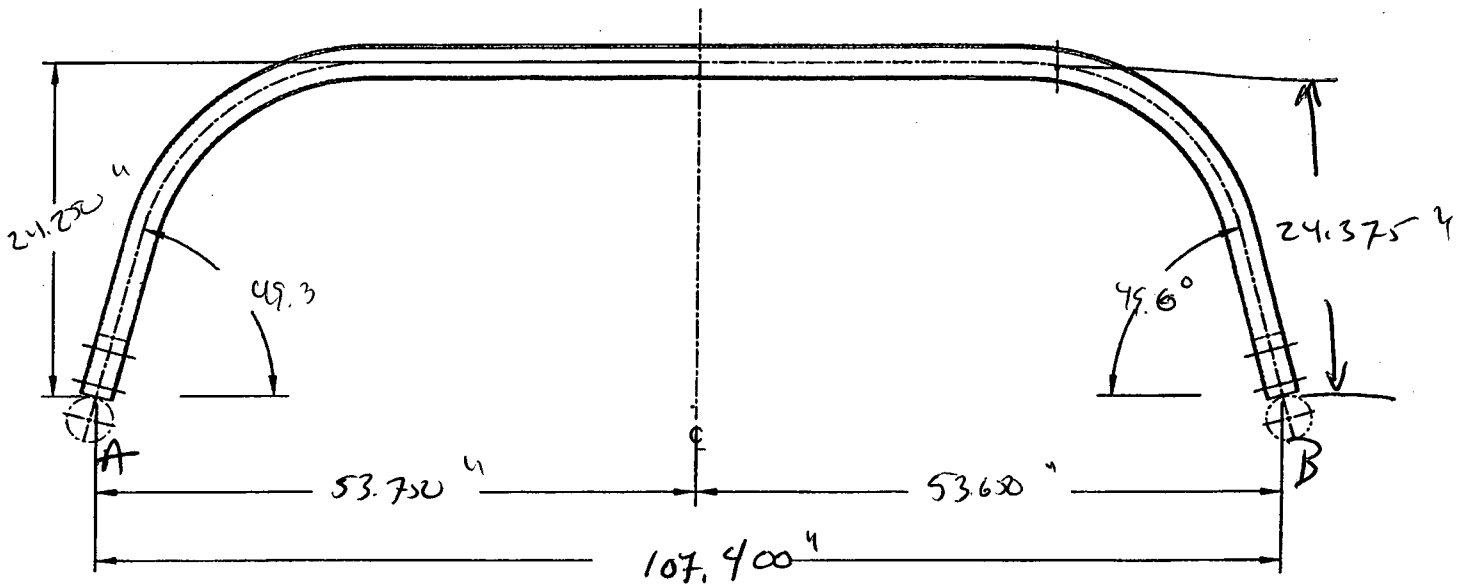
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DART AEROSPACE LTD		Work Order:	67587
Description: Crosstube High Aft (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243		Rev: E	Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	8
Date	11/25/14

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Item	Qty -243	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF
CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE
SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE
FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE
D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF
CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF
CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND
THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOW CHG
RETURN TO
ENGINEERING
UNCONTROLLED
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 67557
2/11/03-28

RELEASED
2009-10-29
WJP

E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 06-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398. MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. REV. E D412-664-243 SHEET 1 OF 4 TITLE SCALE CROSSTUBE ASSEMBLY (412 HI AFT) NTS	
DRAWN	RF		
CHECKED	PH		
MFG. APPR.	PH		
APPROVED	PH		
DE APPR.	PH		
DATE	09.09.30	<small>COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

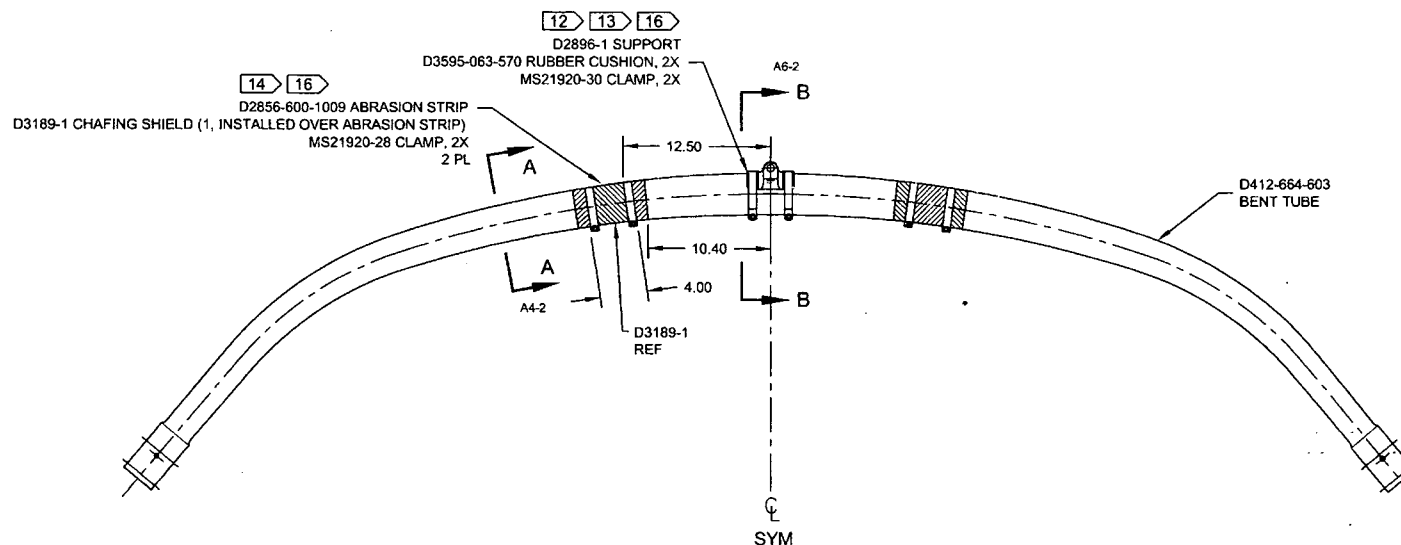
W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

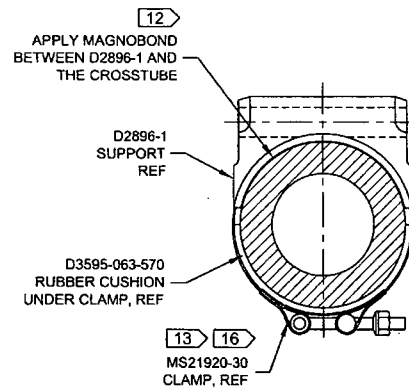
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

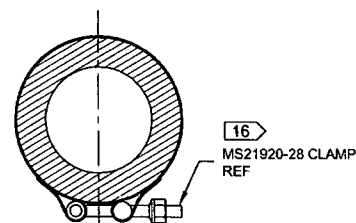
NOTE: Date & initial all entries



D212-664-243
ASSEMBLY DETAIL



SECTION B-B D4-2
SCALE 4X



SECTION A-A C6-2
SCALE 4X

RELEASED
2009-10-29
NRP

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	PS	DRAWING NO.	REV. E
MFG. APPR.	PS	D412-664-243	SHEET 2 OF 4
APPROVED	PS	TITLE	SCALE
DE APPR.	PS	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

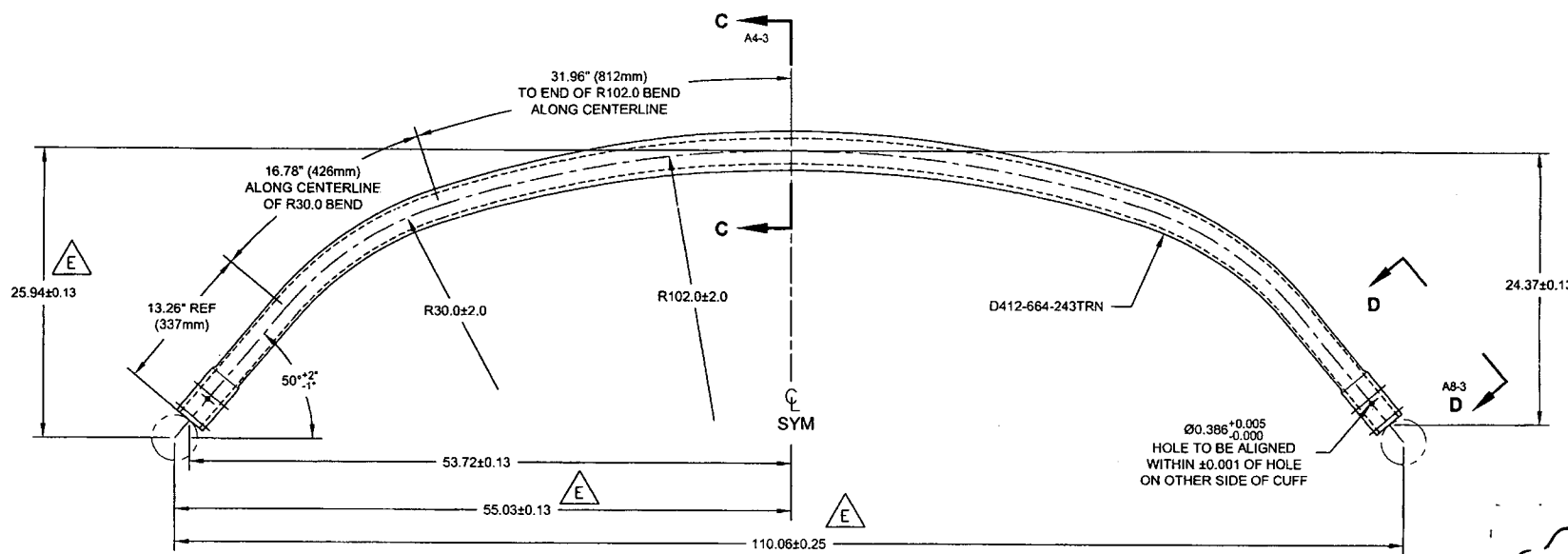
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

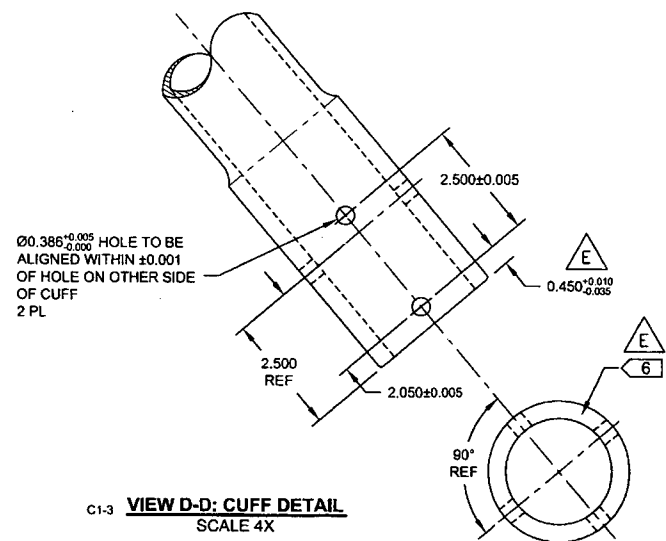
8 7 6 5 4 3 2 1



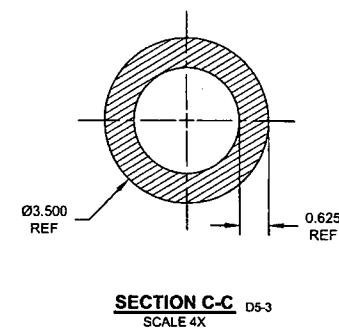
D412-664-603 10 E
BENDING AND DRILLING DETAIL

u/b 67557

RELEASED
 2009-10-29
MP



C1-3 **VIEW D-D: CUFF DETAIL**
 SCALE 4X



SECTION C-C D5-3
 SCALE 4X

DESIGN	<i>PH</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>PS</i>	DRAWING NO.	REV. E
MFG. APPR.	<i>PS</i>	D412-664-243	SHEET 3 OF 4
APPROVED	<i>PS</i>	TITLE	SCALE
DE APPR.	<i>PS</i>	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2001 BY DART AEROSPACE LTD <small>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

W/O:		WORK ORDER CHANGES						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



ACUREN

LIQUID PENETRANT TEST REPORT

P- 05608

CLIENT: DART AEROSPACE DATE: MAY-13-2011 PAGE 1 OF 1
ATTENTION: LINDA LACELLE/CHANTALE LIAN ACUREN JOB NO. 188-11-02126 TIME AM ☒ PM ☐
ADDRESS: 1270, ABERDEEN RD PO/VO NO. 14084
HAWKESBURY, ON WORK LOCATION: AS ADDRESS
ACCEPTANCE STD. ASTM E1417/05E-03B REV./DATE: 2005
PROJECT: WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 6X "CROSSTUBES"
ITEM(S) EXAMINED: SEE BELOW

JOB DESCRIPTION: _____ PROCEDURE NO. LT-002 REV./DATE 2008 TECHNIQUE NO. LT-002 REV./DATE 2008
ART NO. _____ MATERIAL: ALODINE - ALUMINUM THICKNESS: N/A
SCOPE: PERFORMED A WET-FLUO L.P.I. ON 100% ON THE EXTERNAL SURFACE ON 6X "CROSSTUBES"

TEST DETAILS
METHOD: ☒ FLUORESCENT ☐ VISIBLE ☐ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND: MAGNA FLUX BLACK LIGHT S/N: 13798 ☐ OUTPUT > 1000 μ W/cm² ☒ AMBIENT < 2 fc
ENETRANT: ZK-67 MINIMUM DWELL TIME: 10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
ENETRANT REMOVER: H₂O MINIMUM DRY TIME: >10 MIN. OTHER: _____
DEVELOPER: SKD-33 MINIMUM DWELL TIME: 10 MIN. LIGHT METER S/N: _____ CAL DUE DATE: Aug/05/2011
DEVELOPER TYPE: ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
SURFACE CONDITION: ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE: ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

ITEM	COMMENTS	ACCEPT	REJECT
1	CROSSTUBE - W.O. ID 69298	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	W.O. ID 69299	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	W.O. ID 69355	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	W.O. ID 67436	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	W.O. ID 67557	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	W.O. ID 67560	<input checked="" type="checkbox"/>	<input type="checkbox"/>

NO RELEVANT INDICATION WAS DETECTED AS PER APPLICABLE STANDARD

AFT 11-09-13

Scope of Services: The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care: In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE: Ron Tiley PRINT [Signature] SIGNATURE
TECHNICIAN (SIGNATURE): [Signature]
NAME (PRINT): YVES DESROSIERS 1ST TECHNICIAN
CGSB LEVEL: 2 SNT LEVEL: 3 CGSB REG. NO: 3049
2ND TECHNICIAN
CGSB LEVEL: — SNT LEVEL: — CGSB REG. NO: —
DTR # E44648
REPORT REVIEWED BY: _____ NAME _____ INITIALS _____

